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1. This report examines the methods, terms, and criteria associated with the determination of student performance objectives. It presents a broad analysis and discussion of the kinds and purposes of objectives and of the problems that arise in connection with their use in the Army.

2. Educational and training research literature was examined to identify procedures currently in use for determining instructional objectives. In addition, by means of questionnaires and interviews, information was obtained from personnel at eight Army service schools regarding procedures used in making decisions about what to include in instruction.

3. It is believed that the principles and the discussion of student performance objectives classification factors described will assist instructional specialists and managers, especially those concerned with service school instruction, to provide more effective guidance in the development of instructional objectives.

FOR THE CHIEF OF RESEARCH AND DEVELOPMENT:

1 Incl
Report

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The Derivation, Analysis, and Classification of Instructional Objectives

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FOREWORD

This research was conducted by the Human Resources Research Office under Task INGO, Methods for Deriving Instructional Objectives. This report is designed to present an examination and clarification of the methods, terms, and criteria associated with the determination of student performance objectives. Distinctions are made between kinds of objectives and their purposes for use by training managers. Decisions influencing the utility and communicability of performance objectives may thus be more specifically responsive to training organization needs.

Appreciation is extended to the many individuals in the U.S. Continental Army Command and Army service schools for their cooperation in giving their time to discuss current practices in making instructional decisions.

The research scheduled under Task INGO is completed with publication of this report. The research was conducted by HumRRO Division No. 5 (Air Defense) at Fort Bliss, Texas, while Dr. Robert D. Baldwin was Director of Research. Military support for the research was provided by the U.S. Army Air Defense Human Research Unit. The Military Chief of the Unit was Lt. Col. Leo M. Blanchett, Jr.

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SUMMARY AND CONCLUSIONS

Purpose

The purpose of this research study was to clarify the methods, terms, and criteria associated with the determination of student performance objectives, by synthesizing and applying the relatively new developments in Human Factors research on this subject in the past decade, and providing additional information to the instructional specialist and manager about performance objectives and the ways in which they differ. With such knowledge, instructional personnel may be able to provide more precise guidance on development of performance objectives appropriate to their particular organization, in the light of the several purposes performance objectives serve in their instructional institutions.

Approach in the Study

Selected educational and training research literature was examined to identify procedures currently being used or proposed for determining instructional objectives. In addition, a survey of eight Army service schools was accomplished. Using questionnaires and interviews, information was obtained from these schools regarding the procedures employed in making decisions about what to include in instruction. Numerous sample objectives prepared by a large variety of individuals and agencies were examined to identify commonalities and differences.

On the basis of data obtained from the literature review and from the survey of school practices, important problems that arise in connection with performance objectives were identified. An intensive analysis of these problems was undertaken with the goal of developing a more meaningful and productive conception of performance objectives.

Selected Conclusions and Implications

(1) The examination of numerous performance objectives prepared by the Army service schools and by other agencies showed several important differences. In some objectives the extent of the description of the student action was elaborate and detailed, while in other objectives the student action was described only briefly. Some objectives required the student to perform actions that possessed an obvious relationship to job requirements; in other objectives the relationship was quite nebulous. Many objectives reflected an overriding concern for feasibility and convenient measurability. The terms used to denote student action tended to be precise in some instances, but quite vague in others. Most statements of objectives failed to include the important conditions and standards of performance expected of the student. When standards and conditions were included, they were more frequently relevant to the school situation than to the job situation.

(2) Within Army service schools, much current effort has been devoted to converting existing instructional scopes and topics to the form of student performance objectives. The relevance and meaningfulness of the student actions produced by such conversion efforts have suffered from the lack of thorough definitions of the intended work performance situations.

(3) The survey of the Army service schools revealed that an average of 7.7 hours of decision effort was expended for every hour of scheduled instruction. Decision effort included the time spent in gathering information on which to base decisions concerning the subject matter to be included in training. The less specific the intended performance situation, the greater the ratio of decision effort to instruction time.

(4) To highlight the role of performance objectives in instruction, a conception of the sequence by which instruction is developed when formulated. This sequence may be viewed

as a general framework in which student performance objectives are derived. Two primary kinds of performance objectives evolve from this sequence: terminal and enabling.

(5) One major source of confusion about performance objectives has been the failure to distinguish between terminal and enabling objectives. Terminal objectives are representations of the ultimate performance capabilities to be sought by the instructional program. Their derivation is determined only by considerations of "relevance to the intended performance situation" and of "criticalness of their need for formal instruction." Enabling objectives, on the other hand, are not instructional goals *in and of themselves*. Rather, they are dependent upon terminal objectives for their value. Enabling objectives are the necessary student learning tasks that bridge the gap between existing student ability and each derived terminal objective. Knowledge of both terminal and enabling objectives is essential for designing meaningful, efficient, and appropriate learning experiences for students.

(6) Terminal student performance objectives vary on five important factors:

(a) Type of performance unit.
(b) Extent of action description.
(c) Relevancy of student action.
(d) Completeness of structural components.
(e) Precision of each structural component.

By identifying the level of each factor that is represented in an objective, it becomes possible to classify objectives. This classification then permits comparisons to be made of objectives produced by different individuals or agencies.

(7) Numerous methods for deriving terminal objectives are available, but each method has certain capabilities and limitations with regard to the five factors on which objectives vary. The effectiveness of a given derivation method is influenced by the manner in which that method is actually applied.

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The Derivation, Analysis, and Classification of Instructional Objectives

Chapter 1

CURRENT PRACTICES AND PROBLEMS

Purpose of the Research

The research in Task INGO was concerned with the type of instructional objectives that are stated in terms of the actions expected of students upon completion of instruction These objectives have been variously referred to by such labels as "student performance objectives," "duty-oriented objectives," and "behavioral objectives," among others. Current practices and problems encountered by agencies in their attempts to prepare objectives were surveyed. In addition, a system for analyzing instructional objectives by identifying factors that influence meaningfulness and usefulness was developed.

This information is intended to assist the efforts of instructional specialists and managers to provide effective guidance for the development of objectives within their institutions. Although the research focus was primarily for military service school instruction, the principles expressed and factors described should pertain to any formal instructional system or institution.

This report is not intended as a handbook of procedures on how to derive objectives. Rather, its purpose is to examine and clarify the troublesome issues involved in obtaining meaningful and useful performance objectives.

Background

Many individual instructors, schools, colleges, and training institutions have recently undertaken the task of preparing student performance objectives for their instructional programs. The interest in stating instructional objectives in terms of what the student should be capable of doing upon completion of instruction has evolved from three independent instructional movements.

The earliest of these was that of Tyler and his associates (1,2,3) who were concerned with specifying the goals of education in terms that would be meaningful and useful to the classroom teacher. For over 35 years Tyler has developed, and strongly influenced other educators toward, the notion of describing objectives in terms of student performance after course completion.

The second development has arisen during the past 12 years out of the need to prepare men to operate and maintain large, complex military weapon systems. Through the pioneering efforts of Miller (4,5,6) and others, procedures for describing and analyzing job tasks were developed. In these task and skill analyses the performance requirements of job incumbents are extensively investigated and stated.

The third development concerns the concept of programed instruction which made very clear the need to provide specific guidance on instructional objectives to the writers of programs (7,8). To many individuals, however, it became apparent that the value of having precisely stated student performance objectives was not unique to programed instruction. On the contrary, the

establishment of specific and meaningful instructional objectives was viewed as a good pedagogic principle, regardless of the method of instruction one might use.

The ideas in these three independent movements are beginning to merge (9), and it can be expected that the instructional field will witness an ever-increasing involvement with the preparation of student performance objectives.

Curriculum analysts have long been sensitive to the utility of stating performance objectives for instructional programs. However, it was not until publication of Mager's Preparing Objectives for Programmed Instruction (7) that a full-scale interest in student performance objectives became evident.

Basically, Mager maintained that to prepare a meaningfully stated objective that will succeed in communicating the writer's intent, the objective should satisfy three important criteria. The objective should:

(1) Describe what the learner will be doing to demonstrate that he has attained the objective.

(2) Describe the important conditions under which the learner must demonstrate his competence.

(3) State the standards of performance expected of the student.

These three items constitute the basic structural components of an objective. Additionally, to avoid confusion or misunderstanding of the intent of an objective, Mager suggested that the writer should:

(1) Employ specific action words that preclude misinterpretation.

(2) Provide sufficient detail to assure that other qualified persons can recognize the behavior, and that other behaviors would not be mistaken for the desired behavior by them.

(3) Prepare a separate statement for each objective.

Although Mager dealt forthrightly with the form in which instructional objectives should be stated, he did not deal with procedures by which one could derive objectives. The form in which an objective is stated is important for communicating the goal of instruction; however, whether that objective is valid may be even more important. In other words, although statements of performance objectives can be prepared (that is, written) without first determining the nature of the actual performance requirements, such a process does not assure the preparation of valid or relevant objectives. Thus, if objectives possess doubtful validity, there is little justification for preparing them, and there is little likelihood that they will have an appropriate impact upon instruction.

In substance, then, the fundamental rationale underlying the need for student performance objectives is as follows:

(1) The derivation of job performance requirements must be accomplished prior to the preparation of statements of objectives.

(2) The preparation of formal statements of objectives, incorporating the desired performance requirements, is necessary for effective communication.

(3) The use of these statements of objectives in the design and preparation of instruction, as well as in its management, must occur to insure that the instruction is consistent with the stated objectives.

Many efforts have been made to specify the actions expected of students; however, some of the objectives that have been prepared represent little more than an exercise in semantics, or restatement of existing school test items. For example, neither converting nonperformance objectives of existing courses into the form of performance-oriented objectives, nor assuming that the use of specific behavioral verbs to describe what the student should be able to do upon completion of instruction, automatically insures that the resulting statements are performance objectives.

In light of this confusing state of affairs, a clarification of terms and procedures associated with the derivation and preparation of instructional objectives appeared to be needed.

Scope of the Study

Two basic sources of information were used in this study. First, selected educational and training research literature, including technical papers and educational texts, was assembled and examined to identify currently used or proposed procedures for deriving, developing, and stating instructional goals.

Second, selected Army service schools were visited to obtain information from school personnel regarding the procedures employed in making decisions about the content of courses of instruction, and to obtain copies of sample objectives prepared at each school. To assist in gathering information, questionnaires constructed for that purpose were administered. Estimates of the time spent in each school in making instructional decisions were also obtained from school personnel.

From information obtained from these two sources, some of the most important problems that arise in connection with performance objectives were isolated for further study. An intensive analysis of these aspects was undertaken with the goal of developing a more meaningful and productive conception of performance objectives.

An overview of practices currently used in Army service schools for making decisions on what to teach was obtained by interviewing personnel representing a wide range of instructional interest. Findings of this survey, along with illustrations of the variations found in statements of performance objectives, are presented in the remainder of this chapter.

With this overview as a background on the existing practices, the remainder of the report deals with factors and features that shape the form and value of student performance objectives. The basic sequence in which valid objectives may be developed, distinguishing between two essential kinds of objectives—terminal and enabling—each of which has value in designing instruction, is delineated in Chapter 2. The nature of terminal objectives and a means for classifying the important variations that may occur in such objectives are discussed in Chapter 3. Guidelines for evaluating derivation methods are presented in Chapter 4.

Survey of Service School Practices

The survey was conducted at eight Army service schools.[1] This survey was performed to determine the kinds of procedures actually used in making instructional decisions, and provide background information for the present research beyond that pertaining to civilian schools and programed instruction.

More than 100 staff personnel from the schools were interviewed. (See Table 1.) A wide range of instructional interests was represented, from school Directors of Instruction and Educational Advisors, to classroom instructors.

[1]There were four technical service schools (Engineer, Ordnance, Quartermaster, Southeastern Signal), two combat arms schools (Air Defense, Infantry), and two others (Civil Affairs, Command and General Staff College). Five of these schools were concerned primarily with training of equipment operators and technicians (the technical service schools and Air Defense). The remaining three schools were less equipment-oriented, and concerned more with such matters as tactics and doctrine in generalized performance situations.

Table 1

Categories and Numbers of Individuals Participating in Survey

Categories	Number of Persons Interviewed	Number of Interviewees Completing Checklists
School Commandants, Asst. Comdts., Directors of Instruction (DOI), Dep. DOI, Educational Advisors to Comdts. or to DOI	17	1
Directors of Instructional Departments and Deputy Directors	12	7
Department or Division Educational Advisors/Specialists	13	4
Chiefs and Assts. of Instructional Divisions and Branches	20	12
Chiefs and Assts. of Noninstructional Divisions and Branches (curricula, Programs of Instruction, evaluation, etc.)	18	4
Chief Instructors, Section Chiefs, Senior Instructors, and Training Supervisors	14	10
Instructors, Author-Instructors	12	11
Others	15	10
Total	121	59

Type of course ranged from Army Command and General Staff College courses to qualification courses for equipment repair specialties. Decision situations studied included those pertaining to such matters as development of a new course, major revisions of existing instruction, and annual reviews of instructional programs.

Estimates of the time spent by school personnel in making decisions about what to include in instruction, as well as numerous statements of instructional goals, were obtained from each school. In addition, two checklists were administered to 59 of those interviewed at the schools. They were asked, for a particular course on which they had recently worked, to indicate what information sources were most used, and what types of information were most sought, in determining what should be taught. The interviews and checklists pertained to actual efforts, regardless of whether the instructional goals were stated in the form of student performance objectives.

Checklist 1, Information Sources, contained 86 items while Checklist 2, Types of Information, contained 62 items. A complete copy of each checklist is provided in Appendix A. Interviewers explained items, if necessary, and discussed how the school made its instructional decisions with those filling out the checklists.

On the average, each respondent indicated that he used 27 (32%) of the Information Sources in the checklist and 35 (56%) of the Types of Information. Information gained from interviews with other school personnel tended to confirm the checklist results.

Information Sources

Examination of responses on the Information Sources checklist showed a predominant reliance upon immediately available sources: field-experienced

school personnel, school instructors, existing training literature, and existing instructional programs. The major exception to use of school sources was for training for new equipment; in this case, the contractor and the equipment itself were prime sources of information. Descriptions of Military Occupational Specialties (MOSs) were commonly used as reference material for MOS-preparatory courses; but descriptions of jobs were seldom prepared in the process. Incumbents in jobs for which the training was aimed were sought out at their job locations by one-third of the respondents, their job supervisors by two-fifths. These contacts were usually by means of some survey form or questionnaire. Informal contacts with field personnel were often maintained by the school staff. Judgment of individuals was used more predominantly for non-equipment courses than for equipment-related ones, indicating that for such courses the school personnel are often assumed to be the subject matter experts.

Types of Information Used

Responses on the Types of Information Checklist showed similar answers among all respondents. Some of the most frequently sought types of information were:

Job Occurrence Information
Activities performed or used in actual job situations (83% of 59 respondents)
Degree of proficiency required on the job (78%)
Actual job assignments of those completing the courses (73%)

Value Judgments
The consensus on whether the item should be taught (81%)
Items required or directed by some authority (76%)

Training Feasibility
The possibility of completion of the training within the time allotted (85%)
Whether the behavior is a measurable one (75%)

These few items show that information on job performance requirements was very desirable for making training decisions. This information was obtained mainly from sources available at the school location. Performance information generally was not recorded or used systematically to provide a consistent basis for determining the instructional merits of each relevant skill or task. Most of the schools were geared, however, for the systematic recording and review of instructional topics, reflecting the fact that topics (and not performance objectives) are the principal means now used for describing instructional goals and intents. Thus, there were formal methods used for balancing the proportion of time assigned to major topical areas, as well as highly structured review processes of topical scopes of instruction. A wide range of information went into such evaluations.

There was a greater tendency to obtain information from the job situation for equipment-related courses (such as maintenance instruction programs), than for nonequipment ones (such as officer instruction programs). Nonequipment courses depended mainly on value judgments and feasibility considerations. Equipment courses gave evidence of interest in problem indicators (particularly items 34, 35, and 41 on Checklist 2) as well as additional aspects of job occurrence information (items 2, 9, and 22 on Checklist 2). When dealing with only

a limited segment of an equipment course, interest was concentrated heavily on problem indicators (items 34, 37, 38, 42, 45, and 53 on Checklist 2). Measurability of the training matters (item 62) was of more concern to persons somewhat removed organizationally from the actual instruction than to the instructors and their immediate superiors. The overriding concern of all persons was the time allowances for accomplishing instruction (item 59).

It had been hoped that the checklists would reveal several patterns of approaches, each associated with a particular type of school situation and instructional need. However, except for the few differences discussed above, no definite patterns were evident in the analyses of the checklist responses.

Time Spent on Curriculum Decisions

In the interview, instructional personnel were asked how much effort was actually spent in getting information to make curriculum decisions. These estimates did not include the time required for preparing the actual instruction, but only that time required for deciding what the students should learn from that instruction (including the time spent in getting information on which to base the decisions). A total of 43 persons were able to provide estimates of the amount of time spent. Others could not give specific values but could indicate only generalities, such as "considerable," "hundreds of hours," and "countless." When a team effort was involved, the time of all persons was included.

Responses of nine personnel from the Command and General Staff College were not included in the analyses of these estimates because their efforts differed widely from those in the service schools. The College personnel

Table 2

Ratios of Decision Time to Instruction Time

	Number of Persons in Subgroup	Time Ratio of Decision Effort to Instruction
Respondents Close to Instruction ($N = 22$)		
Type of Instruction		
Equipment	12	4.2 to 1
Nonequipment	10	17.6 to 1
Situation		
New course	4	6.4 to 1
Major updating or review	7	11.3 to 1
Routine updating or review	9	11.3 to 1
Other	2	2.1 to 1
Respondents Distant from Instruction* **($N = 12$)**		
Type of Instruction		
Equipment	7	3.7 to 1
Nonequipment	5	5.2 to 1
Situation		
Major updating or review	7	4.7 to 1
Routine updating or review	3	4.3 to 1
Other	2	3.4 to 1
Average for Four Type-of-Instruction Subgroups	34	7.7 to 1

*Such as the Director of Instruction, his staff, and department directors.

estimated 68.6 hours of "decision time" for 1 hour of scheduled instruction. This ratio reflects the special situation at the College where the author-instructors are acknowledged subject matter experts and devote much of their time to maintaining that expertness.

Omission of the Staff College data left estimates from a group of 34 respondents for analysis. Because time and effort responses tended to vary, depending on the type of instruction and the nature of the job held by the person responding, the respondents are presented as subgroups in Table 2 which gives the average decision-to-instruction ratio for each of them. The table also separates the responses according to the type of situation that caused consideration of the instructional objectives. The average ratio across the four main subgroups was 7.7 to 1.

On the basis of the values in the table, it appears that much effort is now being expended in making instructional decisions. Note, for example, that school personnel close to instruction in nonequipment courses spend, on the average, 17.6 hours in deciding what to teach for each hour of instruction. Based on this ratio, an 8-week career course for officers requires nearly three man-years each time the course needs to be completely reconsidered. Nearly one additional man-year is expended in reviews by more distant school personnel. For an 8-week equipment course, nearly one-and-a-half man-years of effort is expended by all school personnel in one periodic review or updating of the course.

Common Problems in Developing Objectives

In studying numerous statements of objectives prepared by the Army service schools, as well as statements prepared by other agencies, many important differences were noted. For example, while some objectives have been prepared in great detail, others have been quite brief. Note the great difference between these two statements about the same activity:

> *Make* a standard field wire splice.
>
> Using rubber and friction tape, Pliers TL-13-A, and Wire WD-1/TT, *make* a standard field wire splice, by completing each of the following steps in sequence:
>
> a. From one conductor, cut off one plier's length, about six inches.
> b. Mark each conductor six inches from end by inserting one conductor at a time into small hole in jaws of pliers.
> c. Close pliers.
> d. Insert long conductor in small hole about two inches from end.
> e. Close jaws carefully, remove insulation.
> f. Repeat procedures for each conductor.
> g. Tie long conductor of one pair to short conductor of second pair, using a square knot.
>
> (And so on, to include all steps of the procedure.)

The extended treatment in the second objective calls attention to each particular item in the step-by-step process instead of, in effect, simply stating the goal to be achieved.

Another important difference in objectives is related to the nature of the student action required. Here are two pertinent examples:

> *Field strip* the major components of an M-14 rifle under conditions of total darkness within five minutes.
>
> *Complete* a 100-item multiple-choice examination on the subject of marine biology. The lower limit of acceptable performance will be 85 items answered correctly within an examination period of 90 minutes.

These two statements of objectives appear to be complete in that each states an action, a standard, and a performance condition. The action verb in each statement is also quite specific. Note, however, that while the first objective has an obvious relationship to an actual work situation, the second does not. The action of "completing a multiple-choice test" is usually not performed outside of a school setting.

Some statements of objectives are of questionable usefulness because they fail to communicate clearly the action expected of the student. An example of such a statement is as follows:

> *Relate* the preservation of freedom to the exercise of individual responsibility.

From such a statement one could not specify the particular behavior a student should demonstrate to indicate that he has achieved the intended goal of the instruction.

Some schools actively seek out the needed job information, while others rely heavily on information that is available at the school or in the existing course of instruction. In the latter case the objectives are often incomplete; that is, they fail to state the important performance conditions or standards—primarily because such information is not readily obtained.

In some instances standards and conditions are given which pertain to those of the job. In many other cases, however, the relationship of the conditions and standards to job requirements appear to be difficult to establish. For example, a standard such as "The student must have no more than 2 of the 12 procedural steps out of sequence," is not, properly, a job standard if the job requires that no steps be out of sequence.

Another practice that creates problems is an overriding concern for convenience of measurability. This practice leads to preparing statements such as:

> *List* in order the major parts of the standard staff study outline. The student may not use any assistance. He may omit, have out of sequence, or misname no more than one major part.

Although such an objective is easy to measure, it is difficult to justify as a standard for job performance. Using the statement as an objective involves resting on personal opinion rather than on a specific analysis of job relevance.

In addition, a wide variety of terms have been used for identifying the kinds of objectives that are being produced. These terms will be discussed in the next chapter.

The net result of all this diversity has been confusion and dissatisfaction on the part of school personnel. Even though considerable attention has been given to preparing objectives, they have had little impact upon instruction. Too often they have been little more than word exercises. Benefits to instruction from such efforts have been due more to the fact that school personnel have taken a closer, more careful look at their training content, than to intrinsic value arising out of the objectives themselves.

Chapter 2

THE USE OF OBJECTIVES IN INSTRUCTION

A Sequence for Developing Instruction

In order to deal effectively with the many problems of performance objectives that became evident in the examination of the literature and the survey of current school practices, it was concluded that a conception of the sequence of development of instruction would be extremely useful.

Figure 1 illustrates this sequence. The figure also indicates, in light shading, the sequence frequently followed when only a topical outline of the course content is used to guide the development of instruction.

Instructional Aim and Scope

The dominant purpose of any instructional institution is to produce students who will, as a result of instruction, be capable of exhibiting certain desired skills and knowledges in a particular anticipated work, school, or life situation. In the management of instruction, the institution provides guidance and direction to its instructional staff. Thus, the initial aim and scope of instruction are mainly dependent upon the policy and guidance of the instructional institution.

Initial decisions—indicated by the top box in Figure 1—about conducting instruction might be made by any one of a number of individuals. In an Army service school the decision may be made by the Commandant of the school, the school's Director of Instruction, a department head, a special curriculum committee, or by an individual instructor or teacher. As in all educational institutions, the establishment of curricular aims and scopes involves abstract philosophical factors and values as well as the direct utility of the overall learning need.

In any event, the need for instruction has been established, the time available for the instruction has probably been decided upon, and a statement of the general intent or purpose of the instruction has been expressed.

Some examples of instructional aims available at this point might be these:

> To provide basic branch training and orientation for newly commissioned officers, such instruction being given in an 8-week school course.
>
> To enable the student to correct simple troubles in Telephone Terminal AN/TCC-50 (AN/TCC-7), Telegraph Terminal AN/TCC-4, Radio Set AN/TRC-24, and Telephone Terminal AN/TCC-3
>
> To increase the student's knowledge of the tactical principles and doctrine pertaining to infantry division offensive operations and the application of these principles in staff planning for a coordinated attack.
>
> To develop, during a 3-hour block of instruction, a general knowledge of automatic data processing systems as applied in the military.

Sequence in Which Instruction is Developed

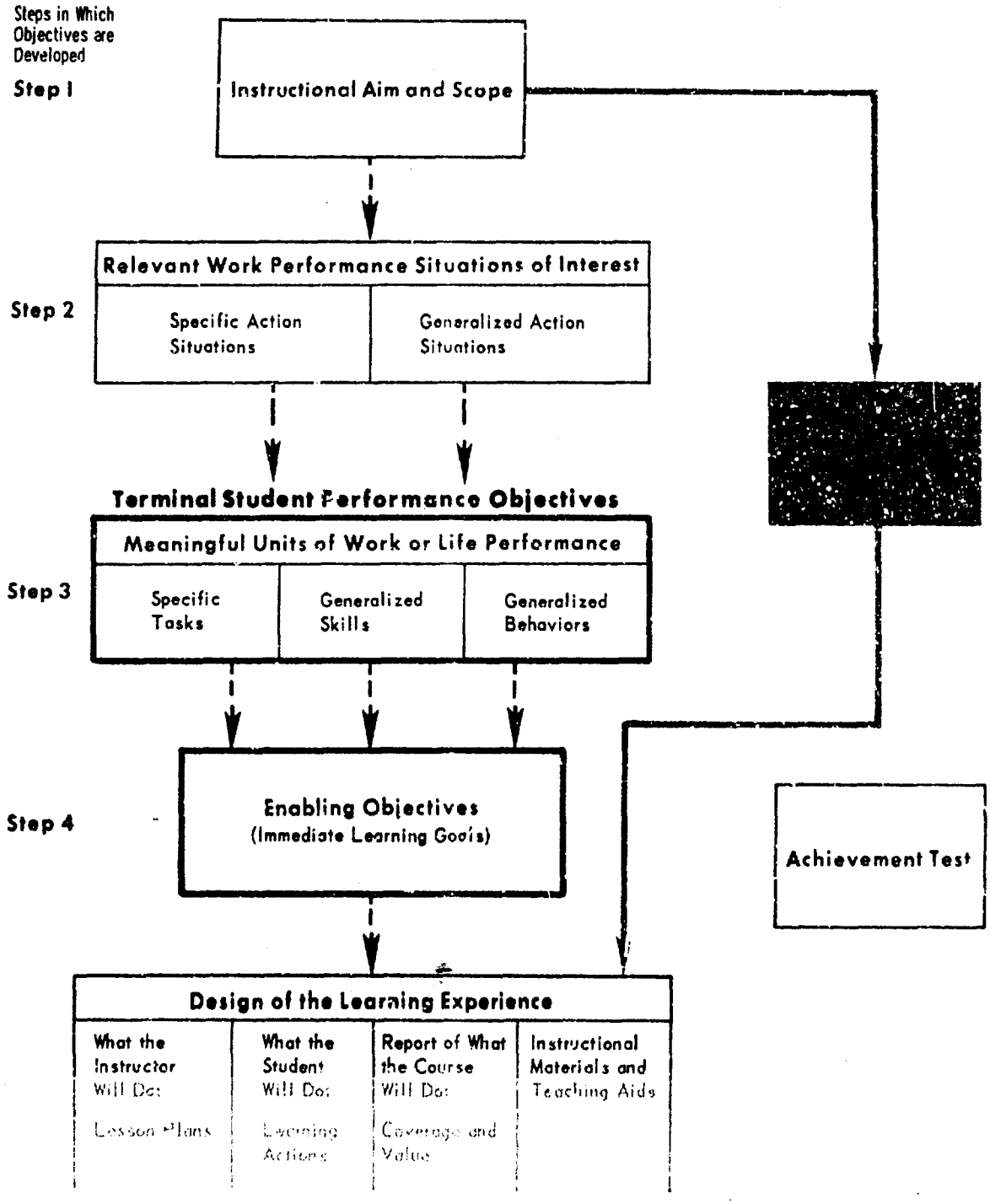

Figure 1

Some of the aims given above are stated in the form of general performance objectives and some are not. While it is not necessary for aims to be stated in performance terms, the more clearly these initial statements prescribe what the student must be able to do, or what must be the outcome of instruction, the more readily can student performance objectives be developed.

Performance Situations of Interest

Once the instructional aim and scope have been established, the work performance situations of interest must be identified. The purpose of this is to place appropriate constraints upon instruction, limiting and defining what is to be considered relevant. As used here, the term "work situation" refers to that performance situation for which the student is to be prepared, and in which he will be expected to perform effectively after instruction. In some instances he may proceed directly to a particular job following completion of instruction. In other instances, he may proceed to more advanced instruction for a particular job. In still another instance, he may proceed neither to a specific job nor to other instruction, but rather the work situation may be preparation to assume a particular duty or assignment at some future time. The main point is that he is being prepared for "something." The concept of utility—use in a particular work situation—has been a prime consideration in professional or technical instruction. However, the utility concept can also be applied to a "liberal arts" context by broadening the scope of how the "work situation" is conceived to include any type of life situation for which the student is being prepared.

These intended "work (or life) situations" can be categorized as one of two types:

(1) Specific action situations, such as a particular job or next course of instruction.

(2) Generalized action situations, such as a professional career, or for some general development of the individual.

The process of defining a performance situation is essentially that of performing a systems analysis. A variety of dimensions might be considered in defining a particular work performance situation. For example, unusual environmental conditions such as those which would occur in combat as well as pertinent geographical or cultural conditions might be identified. In a related way, it might be important to identify any organizational or administrative conditions (i.e. facilitating or limiting features) within which the individual must eventually operate. Matters such as probable specific jobs, functions, roles, or likely problem situations would need to be clarified. For a given job, the level of responsibility involved and the degree of autonomy permitted would have an important bearing upon a performance situation. The types of personnel with whom the graduate is to interact, as well as the nature of any probable social, political, civic, or organizational interactions, might also be important kinds of information. If particular types of equipment will be involved, these too should be identified, along with descriptions of missions to be accomplished or major stages of the work flow. The time frame in which use of the learned performances would be required is also important.

The dimensions mentioned here, of course, are only a few of the possible dimensions that might be considered in defining the performance situation for which students are to be prepared. Within any dimension it often would be helpful to identify the likelihood with which a student might encounter each element of that dimension.

The definition of the performance situation is a very critical step in the derivation of valid objectives. It is this definition that establishes the basis for identifying the important performance conditions and standards. Additionally, it identifies and limits the scope of the performance situation for which objectives must be determined.

Terminal Student Performance Objectives

Having defined the work performance situations of interest, it is then necessary to determine what meaningful units of performance are relevant to those situations and are critical for instruction. This might be accomplished by job and task description. Types of meaningful units of performance will be described in Chapter 3.

A meaningful unit of performance is an activity that would be done in its own right in the intended work situation. According to Tyler (3), it should be stated at the level required for effective use in life, the performance of which can be valued in and of itself. Thus, following Tyler's conception, "Able to read French" is too general to be called a meaningful unit of performance, while "Able to read the kind of material that you find in Paris newspapers" is closer to what might be required for effective use in life. "Able to identify the subjunctive mood" might represent a means to the objective, not an objective in itself.

Student performance objectives in which the student action is stated at the level of a meaningful unit of performance are called terminal objectives.

Enabling Objectives

After the terminal student performance objectives have been established, the next activity is directed at determining what the student needs to learn; that is, to determining the enabling objectives. These, in general, consist of the component actions, knowledges, skills, and so forth, the student must learn if he is to attain the terminal objectives. These bridge the gap between where the student is at the beginning of instruction and where he should be upon completion of instruction. In addition to components of meaningful units of performance, enabling objectives may also consist of basic factual and conceptual knowledge serving as background information for terminal objectives.

Achievement Test

An achievement test is necessary to evaluate the results of instruction, but constructing a set of test items is not a step in developing the objectives of instruction. For this reason, no arrow is shown in Figure 1 connecting Achievement Test with the other steps in the sequence.

Design of the Learning Experience

Although the design of the learning experiences follows Steps 1, 2, 3, and 4 in the development of instruction, this activity, like the construction of the achievement test, is not a step in developing the objectives of instruction. Learning experiences are to be designed only after the terminal and enabling objectives have been specified. This function is introduced at this point only to show its location in the sequence of developing instruction; other functions would follow this step.

Implications of the Sequence

Figure 1 depicts the functional steps leading to the design of appropriate learning experiences. Primary concern is placed on the nature of the results or products to be obtained, rather than on how one applies the procedure. Emphasis is on terminal student performance objectives and also on the immediate learning goals, "enabling objectives."

Two primary kinds of student performance objectives are defined as products of this process, though a third kind—"general objectives"—can be inferred. Terminal objectives and enabling objectives are primary products, being produced in the third and fourth steps of the general sequence. Both have meaning and usefulness for the design of learning programs and both are stated much more precisely and in greater detail than the third kind of objective.

The general objective consists of statements of general performance, such as jobs, duties, functions, or other activities that incorporate more than one meaningful unit of performance. Such general objectives are often obtained in the first two steps of the development sequence. They are useful as very [illegible] descriptors of the instructional objectives, but they are too general to be ingful and useful in designing learning experiences.

In addition to the fact that it yields specific kinds of products, the sequence has another major implication of value for instruction. A rationale for evaluating the merit of products obtained in later steps is reflected in the order in which the several products are developed. Thus, once a performance situation has been defined, that definition serves as a basis for justifying the actions, conditions, and standards of each terminal objective. For example:

> The student should be able to field strip the major components of the M-14 rifle under conditions of darkness within five minutes.

The soldier rarely needs to perform the task of field stripping a rifle in the dark or even within five minutes; instead, he is likely to do it at his leisure in a well-lit barracks. On the other hand, a soldier in a combat situation in close proximity to the enemy will need to be able to field strip his rifle to clean it at night under any conceivable kind of weather and other environmental handicaps—and this action is highly critical to his combat effectiveness and survival. It is the function of the situation definition step of the sequence to clarify for which of these two performance situations the student should be trained. Given such a definition, it then becomes possible to devise or evaluate the conditions and standards for the objective.

The terminal objectives serve a similar function with regard to the enabling objectives. Once terminal objectives have been identified, a basis is available for determining whether the enabling objective is truly essential. That is, the question can be asked: "Can students perform the action in the terminal objective without this particular skill or knowledge?" If they can, that skill or knowledge is not an enabling objective.

A Comparison of Terminal and Enabling Objectives

Since some authorities may suggest that it is more meaningful to identify and state enabling objectives than it is to state terminal objectives, some discussion may be useful.

The learning components of a performance requirement must be identified; these immediate learning goals are then to be organized into an effective sequence of learning experiences. However, the value of "enabling objectives"

does not attenuate the value of the "terminal objectives"—the final performance requirements of the learning situation.

Terminal objectives, on the one hand, represent the performance that is to be attained through instruction. They are not the only information needed for preparing an instructional program, but they do constitute a critical early step in such preparation. They establish meaningful and measurable goals for the instruction, upon which all other aspects of the program must be based.

The enabling objectives, on the other hand, represent the learning difference between where the student now is, and where one wants him to be. Thus, they are derived from a knowledge of both the terminal objectives and the existing capabilities of the student population.

A wide variety of specific skills and knowledges can be derived as enabling objectives, often resulting in long listings of objectives for a particular course of instruction. It is in fact the specificity of enabling objectives, plus their great number, that leads to a concern for the usefulness of the notion of performance objectives. Failure to root such objectives in the work performance requirements makes it difficult to discern their meaning and how they relate to one another and to a job.

Some authors have proposed calling the enabling objectives the "terminal" goals of instruction. This is appropriate in the sense that enabling objectives are the last set of student goals—and the most specific—to be identified. But they are not instructional ends in and of themselves; they spell out the means to attain the directly meaningful objectives that we have labeled "terminal objectives." Additionally, when labeled "terminal," the enabling objectives tend to become the focus of attention, diverting instruction away from the acquisition of meaningful units of performance.

Without meaningful units of performance as a framework, it is extremely difficult to organize instruction effectively. Furthermore, in the absence of real terminal objectives, it is not possible to identify the appropriate enabling skills and knowledges. It is for this reason that the label of "terminal" is used for the meaningful units of performance. They exist as valid representations of the instructional goals, regardless of what else is done in designing the instruction. Thus, they serve as the essential basis for establishing instruction and should be the primary concern in developing instruction.

Terminology and Related Problems

Terminology. The survey of the schools and the search of the literature revealed that numerous terms have been used to label various kinds of student performance objectives. Some of these terms overlap in meaning, though there is no way of being certain what each user of a term means when he employs it. Some are probably simply synonyms of other terms. It is this multiplicity of terms and of types of objectives that contributes to large differences in use of terms for objectives. A resultant miscellany of statements of objectives can lead people to an erroneous belief that useful and meaningful objectives are being prepared.

In Figure 2 various terms are associated with the three types of student performance objectives previously identified in the sequence of developing instruction. The placement of terms is based on the meaning that appears to be implied by users of each term. It can be seen that many terms are applied to more than one of the three kinds of objectives identified in this report. Most of the terms are based on the nature of the behavior required of the student or on the specificity level with which the instructional objectives have been stated.

Various Terms Associated With Instructional Objectives

Terminal Objective	Enabling Objective
Performance Objective	Intermediate Objective
Behavioral Objective	Learning Objective
Functional Objective	School-Behavior Objective
Duty-Oriented Objective	Supportive Objective
Duty-Centered Objective	Component Objective
Operational Training Objective	Duty-Enabling Objective
Evaluative Criterion	Subordinate Objective
Specific Objective	Teaching Point
Job Training Standard	Subject Matter Objective
	Learning Outcome
	Lesson Preparation Objective
	Specific Objective
	Subsidiary Objective
	Learning Task
	Task Demand
	Immediate Learning Goal
	Functional Objective
	Behavioral Objective
	Performance Objective

General Objective
Instructional Aim and Scope
Purpose of Course
Course Directive
Course Objective
General Instructional Objective
Course Concept
Training Plan
Functional Objective
Performance Objective

Figure 2

The fact that such a large number of terms have been used, plus the fact that different writers (or schools) have sometimes used the same term but with different meanings, hinders communication. Standardization of terms, therefore, would help eliminate much of the confusion. It is suggested that the distinction presented between terminal and enabling objectives is a good foundation upon which to standardize terms. When statements of the desired outcome of instruction refer to actions that occur on the job, and such actions have job value in and of themselves, then these statements should properly fall into the class of terminal objectives. And, in contrast, statements that refer to actions which serve only to facilitate or assist the student's attainment of the desired job performance should be classed as enabling objectives.

The use of fewer terms, as well as the careful definition of each term being used, should foster more effective communication, thereby eliminating much of the present confusion.

Curricular Assignment of Objectives. Not included in Figure 2 are such terms as "lesson objective," "lesson plan objective," "annex objective," and "subcourse objective." These terms usually mean that a certain objective has been assigned to some particular unit in a program of instruction. However,

this is an administrative action which can be done only after one has designed the actual curriculum of instruction. Since objectives should provide a basis for designing the appropriate learning experiences (i.e. the curriculum), use of such labels has no value for the development of instruction. The term "course objectives" is often used both to designate a curricular assignment and to label a general statement of instructional aim or scope.

Adaptation of Terminal Objectives for Training. Terminal student performance objectives are derived initially from the requirements of the work situation, independently of any consideration of their instructional feasibility. Their identification should be based primarily on factors related to a work situation and important for instruction, with each objective specifying the performance capability to be attained.

However, it is not always feasible to include all of the derived objectives in a particular program of instruction. Some may be omitted because of limited instructional time, learning difficulty, cost of instruction, instructor availability, and so forth. These considerations of feasibility do not degrade the value of derived objectives, but they do affect which ones will be adopted for the instructional program. Different or additional objectives for a subsequent program may be adopted as a result of changes in time, difficulty, cost, and so forth. For example, instruction may have needed to be adapted to an available training device, and, without a clear record of the terminal objectives, adaptations may be perpetuated even when the device is replaced in training by a superior one (or by tactical equipment). Terminal objectives not initially adopted for a program should not be ignored; rather, they become goals for instructional managers, who should try to make their adoption feasible in subsequent revisions of the instructional program.

Often there is a failure to record the derived objectives as terminal student performance objectives before making considerations of feasibility. The result of such failure is that descriptions of the desired performance, the standards, and the conditions may be modified to reflect what appears to be feasible at that time. Since such modification is based on past instructional experience, the resultant modified objectives may sometimes appear very similar to what may be in the existing instructional program.

Many writers of objectives have thought that the measurability of an objective was of prime importance. Thus, to make an objective measurable, it often had to be modified to reflect the school situation and the types of tests used at the school. This leads to stating conditions and standards pertaining to the test situation, such as:

> **Without the use of class notes or textbook, solve at least five problems of type X within a period of fifty minutes.**

Too frequently such modifications result in statements of conditions and standards which have no relationship to work performance requirements. Modifications of terminal objectives may be useful and necessary for constructing the learning experiences and for preparing tests. However, these modifications should be made within the framework of the requirements of the work situation. That is, modifications based on feasibility and school situations should be made only after developing and recording terminal student performance objectives.

The performances and standards for entry level or apprentice workers frequently differ from those of experienced personnel. In such instances the terminal objectives should be derived from a definition of the intended work performance situation for the inexperienced person.

Training Versus Educational Objectives. A number of instructional authorities (including Army Regulation 350-5) distinguish between training and education. For use in deriving instructional objectives, the following distinction is proposed: Whether the context is for training depends on the specificity of the work performance situation from which the objective was derived. If the intended work situation is defined such that very specific actions are required of the student, it seems more meaningful to think in terms of "training objectives." For a more generalized work situation, the skills and behaviors determined to be terminal objectives would be called "educational objectives."

The terms "training" and "education" actually represent two ends of a continuum or "yardstick." The more specific the application of the intended performance, the more reasonable to call it training; the more generalized the application, the more it would seem to represent education. Most instruction, of course, is a combination of these two kinds of objectives. Thus, an insistence upon making the distinction may lead to the misconception that, if the instructional program is called "training," then every objective in the program must be directed toward specific aspects of job performance. In other words, the distinction can have the effect of, improperly, limiting the kinds of activities or learning experiences contained in the course.

Chapter 3

THE ANALYSIS AND CLASSIFICATION OF OBJECTIVES

Factors on Which Terminal Objectives Vary

Now let us turn to the problem of differentiating among the various kinds of terminal student performance objectives. Excluded are statements of performance that are either too general or too specific to be considered meaningful units of work performance. Also excluded are those referring to more than one action. For instance, "Able to plan, install, and operate a radio communication net" would represent at least three meaningful units of performance. In some instances, however, multiple action verbs may be used when they refer to only one meaningful unit of performance, as in "check and adjust the primary power indicator."

After examining a large number of objectives prepared by different agencies, many variations became evident. In attempting to get some order out of this apparent chaos, it seemed useful to devise a scheme by which to classify terminal objectives. Based on an examination, it was concluded that five factors accounted for the significant ways in which most existing performance objectives differed. These factors are:

A. Type of Performance Unit
B. Extent of Action Description
C. Relevancy of Student Action
D. Completeness of Structural Components
E. Precision of Each Structural Component

Factor A: Type of Performance Unit

This factor refers to the meaningful units of work performance previously portrayed in Figure 1. Meaningful units of performance may be of three types: specific tasks, generalized skills, and generalized behaviors. If the instructional aim is to prepare students to perform in specific action situations, then the primary problem is one of identifying which specific tasks are relevant to that situation and are most critical for instruction.

On the other hand, if the instructional aim is to prepare the student for a more generalized situation, somewhat different units of performance will be generated. These may be either generalized skills or generalized behaviors. All three of these units of performance (tasks, skills, or behaviors) are labeled terminal student performance objectives. This label is used because it denotes the final criterion by which to assess the instruction.

Each of the three types of performance units, for convenience, can be considered as a different level of Factor A.

Level 1: Specific Task. A task is one particular activity, the performance of which has value in and of itself in a specific work situation.

It has a clear beginning and ending point, and is typically performed within a short period of time. Some examples of specific tasks would be:

> Perform a gyro azimuth transmission check on a Nike Hercules radar.
>
> Repair a puncture in a tube-type jeep tire.
>
> Give a mission briefing to new unit personnel.

Level 2: Generalized Skill. A generalized skill is the performance of a specific activity in a variety of related but not identical situations. It is a skill that is not limited, for example, to a single set of circumstances, type of equipment, or unique environment. Examples of generalized skills are:

> Weigh materials using the chemical balance.
>
> Adjust the carburetor of any type of gasoline-engined land vehicle.
>
> Prepare abstracts of scientific articles from research journals of a specified discipline.
>
> Plan the organization of a perimeter defense for a given-sized unit under a variety of environmental and geographical conditions.

Level 3: Generalized Behavior. This refers to a general manner of performance or way of behaving. It is not so much a skill as it is a characteristic way of doing things. It is somewhat analogous to a personality trait, but one that can be modified through instruction. The acquisition of moral codes and the internalization of values and concepts needed in a work situation are included under this category of generalized behaviors. Some examples of generalized behaviors are these:

> Obey local traffic laws when operating a motor vehicle.
>
> Establish good working relations with the men in his platoon.
>
> Maintain an awareness of safety hazards when working in a machine shop.

Both a generalized skill and a generalized behavior, to be a meaningful unit of performance, must specify the limits or range of the problem situation. This statement of the scope of the performance is actually a type of performance condition, but for generalized skills and behaviors it becomes a necessary portion of the action statement.

Although these three performance units may be viewed as separate and distinct, there is actually much overlap among them. Thus, a generalized skill may frequently resemble a generalized behavior. Similarly, generalized skills may appear to be task-specific, particularly when a component action that is common to several tasks has been set aside and stated as one generalized skill. An example of this might be: "Compute a square root." On the other hand, some generalized skills may be quite abstract in nature. For instance, a "reading comprehension" or a "decision making" skill is more of a quality than a procedure, yet each is a trainable skill. Such abstract skills are often difficult to state in performance terms, having traditionally been stated as topics, concepts, or other generalizations. They represent an application of general rules rather than a following of specific procedures. Their very abstractness is reason why instruction would benefit from attempts to state them in terms of performance expected from students after instruction.

Factor B: Extent of Action Description

The three levels of description of student action may be identified as:

Level 1: Fully Described
Level 2: Partially Described
Level 3: Stated Only

An objective may be stated so that all required actions are fully described. In other words, the statement of the objective would indicate how, when, and why the action is performed. Such a statement would most likely be possible when a detailed task and skill description had been accomplished. A full description is often desirable for proceduralized tasks and skills, particularly where the procedure sequence must be learned. Component steps and actions of specific tasks usually are stated quite specifically, whereas those for generalized skills are usually stated in more generic terms or are more general in their individual scope of application. Thus, explicit and extensive description of abstract, generalized skills may consist of formulas and rules.

An objective may also be stated so that only portions of the actions involved are described or listed. Thus, an objective may require the student to "Prepare abstracts of articles contained in the American Scientist" and then the main parts of a correctly prepared abstract are listed. Often this is the most detailed extent of description possible for generalized behaviors, and som generalized skills. Performance descriptions for generalized behaviors di.fer markedly from those of specific tasks. Task descriptions pertain to the steps and actions that are components of the task procedure. However, behavior descriptions consist of representative actions that are acceptable as indication of the desired behavior. For example:

> *Maintain* an awareness of safety hazards when working in a machine shop, as evidenced by such actions as:
>
> a. Shuts down machines before performing maintenance.
> b. Disposes of oily rags, waste, and other grease-soaked materials in metal containe
> c. Wears eye protection where flying particles of metal are produced.
> d. Allows lathes to come to a stop of their own accord.

Since it would be rare that complete listings of these representative actions could be obtained and agreed upon, this level is the greatest extent to which generalized behaviors may be described. Specific tasks and some generalized skills, on the other hand, may be extensively described. A partial description of a task generally consists of a listing of the key steps of a procedure, rather than all component steps and actions.

Finally, an objective may state only the action, with no description of how it is to be accomplished. An objective which simply states "Maintain an awareness of safety hazards when working in a machine shop," says nothing about what actions would be accepted as evidence of maintaining an awareness. All of the examples given for Factor A, Type of Performance Unit, are at this minimum level of description.

Factor C: Relevancy of Student Action to Work Situation

With regard to job relevance of student action, three levels of relevance can be identified for any prepared statement of an objective. They are:

Level 1: High Relevance
Level 2: Moderate Relevance
Level 3: Low Relevance

Factor C refers to the relevance of the action or behavior of the student to a given work situation. The statement of an objective will likely be

ghly relevant to a work situation if the substance of the objective has been rived from known work requirements. If the objective requires the student engage in activity identical to that expected of him on the job, then the action obviously highly relevant, such as "Field strip an M-14 rifle" and "Prepare lesson plan."

When an objective requires the student to engage in an activity that is t required or performed in the work situation, it is classified as not relevant. jectives which ask the student to "list," "describe," "select from a list," d so forth, are not usually terminal student performance objectives. They ay, however, be appropriate learning activities involved in attaining terminal jectives. As such, they should be viewed as enabling objectives.

Determining whether the actions required in an objective are relevant done by considering them in the light of information about the work situation d the structural components of a statement of an objective.

The structural components of an objective include: (a) the action atement, (b) the performance standards, and (c) the performance conditions. ch of these parts of a performance objective can vary in regard to whether is relevant to a likely job use. Each must be considered in determining the levance of the objective.

High relevance exists if all the stated structural components of an jective are identical or nearly identical to those in a work situation, or if ey have been derived directly from a known work situation. Lack of job levance obtains when the action, standard, or conditions are not relevant to e work situation.

The relevance of the action verb is one of the most useful cues in aking a determination about relevance of the action statement. In the follow- g examples the action verbs have obvious relevance for appropriate jobs.

> *Field strip* the major components of an M-14 rifle under conditions of total darkness within five minutes.
>
> Using the chemical balance, *weigh* materials accurately to the nearest milligram.

ot only are the action verbs in these examples relevant to work performance tuations, but also the same is true for the performance conditions and stand- ds. Thus both of these performances would be rated as highly relevant.

In the next two sample objectives, the action verbs might be relevant anticipated actions in work, but their relevance is not apparent.

> *Differentiate* between linear and branching programing.
>
> *Explain* the techniques of counterinsurgency.

ese activities represent actions commonly taken only at school. The question relevance can usually be resolved by asking a knowledgeable person whether the tion, as given by the action verb, is one that would be done in the job situation.

Similar questions may be raised concerning the relevance of the other ructural components of the statement of an objective. Performance condi- ons and performance standards are "not relevant" when they pertain only to e testing situation, with no foundation in the important conditions or standards quired by the work situation.

For example, an objective in which the stated performance condition ould not likely be relevant is as follows:

> *Using classroom notes*, the student should be able to convert from the English system of linear measurement to the metric system.

Such a condition would not be considered relevant unless classroom notes, or something closely resembling them, were actually used in the work performance.

Factor D: Completeness of Structural Components

The term structural components (action, standard, condition) was introduced in dealing with the factor of relevancy of student action. The completeness with which these components are represented in a statement of an objective is an important consideration.

A statement of an objective that indicates the action required plus either the conditions under which the action must occur, or the performance standard, would be considered a partially complete statement. In other words, three levels of completeness of structural components are possible:

Level 1: Fully Complete
Level 2: Partially Complete
Level 3: Action Only

An objective in which each of the three structural components was included would be called a complete statement. Such a statement would indicate the complete action required, the standard expected of the student, and the conditions under which the performance must occur.

In contrast, an objective which states that the student must "Energize the generator" is not complete, for it states only what action is required. It says nothing about the kind of generator involved, the procedures to be followed, the conditions under which the action must occur, or the standard of performance that is expected. For generalized skills and behaviors, the statement of the performance scope is an integral part of the action statement, even though it also represents one kind of performance condition. Thus, if only the scope of the problem is stated, and no other performance conditions, then that objective lacks completeness. For example:

> The student should be able to solve linear equations with one unknown.

Statements about performance conditions and performance standards in objectives frequently cannot be separated from other facets of an objective. For instance, note this objective:

> Using a desk calculator, the student should be able to compute a Pearson product-moment correlation coefficient.

Here, "using a desk calculator," can be considered either a qualifier of the action of computing or a performance condition which states the equipment to be used. A wide variety of performance conditions may be relevant and important (8).

Another illustration in which some portions of an objective play dual roles is:

> Using rubber and friction tape, Pliers TL-13-A, and Wire WD-1/TT, the student should be able to make a standard field wire splice, by completing each of the following steps in sequence:
>
> a. From one conductor, cut off one plier's length, about six inches.
> b. Mark each conductor six inches from end by inserting one conductor at a time into small hole in jaws of pliers.
> c. Close pliers.
> d. Insert long conductor in small hole about two inches from end.
> e. Close jaws carefully, remove insulation.

f. Repeat procedures for each conductor.
g. Tie long conductor of one pair to short conductor of second pair, using a square knot.
(And so on, to include all steps of the procedure.)

Here the listing of the sequential steps constitutes both a detailed description of how the task is to be performed (Factor B) and also a specification of the performance standard pertaining to sequence of steps (Factor D).

Such dual roles need not present a real problem, however. The information can be used in both contexts. It is more important for the information to be present in the objective, than to be concerned over how it is labeled.

Factor E: Precision of Each Structural Component

As was the case with all other factors, three levels of precision of structural components may be identified. They are:

Level 1: Fully Precise
Level 2: Partially Precise
Level 3: Vague

Factor E deals with how explicit the statement of the objective is with regard to each structural component. Just as completeness of each component was considered, the precision with which each component is stated may be considered.

The precision of structural components is called "partial" when one or more of the components are not explicit. Misunderstanding of the instructional intent often results from a failure to specify clearly the action standards or conditions for student performance. Thus, if an objective requires the student to "calculate a rho correlation coefficient," without indicating whether it must be done by hand or by desk calculator, it is not as explicit a statement of that action as it should be, unless it is intended that the student should be able to accomplish the action by any method.

If almost all of the structural components are not explicit, the statement will be too diffuse or too vague to be of much use to anyone. Here is an example of an objective that is rather vague:

> Able to monitor an instructor while the latter is instructing a class, to include making critical notes and comments about the instructor's performance.

This statement does not specify clearly what is done when one monitors the performance of an instructor, and there is little or no information given about the conditions and standards expected of the monitor's performance.

Classification of Terminal Objectives[1]

With the introduction now of five factors on which terminal student performance objectives may differ, and with the identification of levels of each factor, it is possible to classify or code any terminal objective by a 5-digit number. The first digit gives the level of Factor A, the second digit the level of Factor B, and so forth. Using this code, any person knowledgeable in the work situation could rapidly provide adequate codings for a set of objectives.

[1]A number of useful means for classifying the immediate learning goals (that is, the enabling objectives) and achievement test items have been proposed by others (10, 11, 12, 13, 14). The present classification deals only with terminal objectives, which are not classified by these other schemes.

Classification of Terminal Objectives

Code Position:

1st	2d	3d	4th	5th
Factor A: Type of Performance Unit	**Factor B:** Extent of Action Description	**Factor C:** Relevancy of Student Action	**Factor D:** Completeness of Structural Components	**Factor E:** Precision of Each Structural Component
Levels: 1. Specific Task 2. Generalized Skill 3. Generalized Behavior	**Levels:** 1. Fully Described 2. Partially Described 3. Stated Only	**Levels:** 1. High Relevance 2. Moderate Relevance 3. Low Relevance	**Levels:** 1. Fully Complete 2. Partially Complete 3. Action Only	**Levels:** 1. Fully Precise 2. Partially Precise 3. Vague

Figure 3

Figure 3 illustrates the arrangement of the five factors for coding purposes. Thus, a coding for an objective might appear as "1, 1, 2, 3, 1." This code would be used for an objective that (a) involved a specific task, (b) described the action completely, (c) was moderately relevant to the work or life situation, (d) stated only the action, not the standards or conditions, and (e) clearly stated the student action.

Three student performance objectives and their coded classifications are given:

> Using rubber and friction tape, Pliers TL-13-A, and Wire WD-1/TT, the student should be able to make a standard field wire splice. 13121
>
> With the use of various training documents and directives that would be available on the job, the student should be able to determine the training that a battalion-size infantry unit needs at any stage of preparedness. 23122
>
> The student should be able to read technical material normally encountered in his field of specialization at a rate of 850 words per minute. 23111

The codings for 11 additional statements of objectives are cited in Appendix B as further illustrations of this process.

Using the Classification Scheme for Management Control and Review

Perhaps the most important implication of the classification scheme, illustrated in Figure 3, is that there is no such thing as one type of performance objective; the figure indicates that terminal objectives may differ widely. Thus, it is easy to see why, when two different objectives are examined, there is sometimes failure to find much commonality. The objectives prepared by one person may not be like those prepared by another simply because the writers have not considered the same factors or levels of factors.

Figure 3, therefore, becomes a convenient tool by which to compare the types of objectives prepared by different people. Those developed by one may be confined to a generalized skill, only stated, moderately relevant to the work or life situation, without performance standards, and of partial precision (coded as 2, 3, 2, 2, 2). Another writer may prepare objectives that are related to

a specific task, fully described, highly relevant, containing all structural components, and stated very specifically (coded as 1, 1, 1, 1, 1). The two are not producing the same thing although both may be called terminal objectives.

The coding of terminal objectives that have been prepared can be of use to managers of instruction in comparing the efforts of different writers in their own institution, and comparing the objectives of one institution with another. This capability could be used in several ways:

(1) In providing guidance for the derivation of objectives, standardization of statements of objectives may be established, so that all may meet the requirements of explicitness, relevance, and clarity. These requirements may be determined by school policy (or by the intent of an individual teacher, if that teacher decides what kinds of objectives are most useful for his purposes). The coding system could then serve the dual purpose of guiding the derivation of objectives and also of providing a means for rapidly identifying which objectives meet the established criteria. Thereby, there should be an increase in the likelihood that the objectives will be of value for their intended use. Different types of objectives may be desired for different users; managers often want brief statements, while curriculum designers and lesson plan writers need more extensive ones. The specifications for specific tasks (or generalized skills which are highly procedural in nature) are likely to be more readily susceptible to extensive and explicit description than will generalized behaviors (or some of the more abstract generalized skills).

(2) In evaluating the proportions of objectives dealing with specific or with generalized action situations. Factor A, Type of Performance Unit, gives one means of measuring these proportions in a total curriculum between such matters as:

(a) Skill acquisition versus attitudinal molding.
(b) Emphasis on detailed facts and techniques versus stress on broad principles and generalizations.
(c) Orientation to practical application versus development of broad perspectives.

(3) In evaluating the worth of a particular method for deriving objectives. For instance, suppose a proposed procedure for determing objectives for a given course might require 3 man-years of effort, whereas the current practice requires only 2 man-years. The current practice appears to be more economical. However, if the current practice only produces brief statements of terminal actions, while the proposed method produced both brief statements and full descriptions, then the judgments of the worth of each might be reversed. Moreover, the proposed method might produce the brief statements with only 1 man-year of effort rather than the 2 man-years currently required.

Considering all possible combinations of this complete 5-digit coding scheme, a large variety of terminal student performance objectives are possible. The number highlights the complexity of the problem of differentiating objectives. However, since certain combinations are meaningless or impossible, the complexity is not as awesome as it might appear.

Consequences of Factor Variations

The potential consequences of preparing enabling objectives without knowledge of the terminal student performance objectives (unmodified by considerations of the school or test situations) were mentioned earlier in this report. There are also important consequences that may result from the use of different levels on each of the five classifying factors. On the basis of the

authors' discussions with many instructional personnel who have tried to use performance objectives, some of these consequences were noted. Considerations of the consequences that may result from the use of particular factor levels should be helpful in deciding what types of objectives should be sought to increase their usefulness and meaningfulness.

Factor A, Type of Performance Unit. Levels of Factor A that may be attained are partially dependent on the method that was used to derive objectives. Failure to attain certain levels may indicate a need to use a different derivation method. Also, incomplete derivation of objectives may result from a failure to attain objectives at certain levels of Factor A, causing the derived objectives to be inconsistent with an established instructional aim and scope.

Factor B, Extent of Action Description. Factor B has a dual role, affecting both the communicability and the usefulness of an objective. Dissatisfaction expressed by a user of the objective may reflect an inadequacy in either or both of these roles. The appropriateness of a Factor B level to clearly communicate the purpose of an objective depends on the knowledge already possessed by the user, with greater extent of description needed for users having less knowledge of the details of the performance stated in the objective. More important, however, at least until greater experience is gained in the use of performance objectives, the desired extent of description depends more on who will be using them. Generally, top instructional managers prefer Level 3, middle and lower managers prefer Level 2, and knowledge at Level 1 is needed by authors of lesson plans, instructional literature, and tests.

Increased description also facilitates the identification of the pertinent enabling objectives. Thus, increased detail of performance description is more useful the closer the user is to the instructional detail. If adequate detail is not given in the objective, then each user would have to provide it himself. This implies that an economy of total effort expenditure could be possible by providing detailed performance descriptions in the statements of objectives. Level 2 is always necessary for clearly communicating generalized behaviors and the more abstract generalized skills.

Factor C, Relevancy of Student Action. High relevance of student action to performance in the intended work situation (a) fosters student interest in learning, by enhancing the realism of the instruction and the learning need; (b) discourages the introduction of arbitrary or subjective elements in the derivation of objectives; and (c) provides a known and valid base from which later adaptations of the objectives might be made on such grounds as feasibility, measurability, and economy.

Low relevance causes difficulty in identifying meaningful units of performance, resulting in many bits and pieces of objectives that are hard to organize into appropriate learning experiences. In addition, low relevance causes difficulty in distinguishing between terminal and enabling objectives.

Factor D, Completeness of Structural Components. Factor D affects the communicability of the intent of the objective, causing differences in what is taught, learned, and tested. Such differences can be the cause of dissatisfaction on the part of students, instructors, and agencies using graduates of the instructional program. Failure to specify performance standards can be a danger signal, indicating that these standards are not known by the instructional personnel. Lack of this knowledge can readily cause the resultant instruction to be inadequate or inefficient. Failure to place limitations on the scope of performance problems leads to the inclusion of extensive background and theoretical material that is likely to have little validity as terminal or enabling objectives.

Factor E, Precision of Each Structural Component. Preciseness enhances the communicability of what is intended by the objective. Thus, it also influences the ease with which the attainment of the objective can be measured. There has been extensive concern that action verbs be very specific and this has overshadowed concern that performance standards and conditions be made specific. Vagueness and generality in defining these other components, as well as their complete absence (as mentioned above in Factor D), detracts from appropriate and efficient instruction (and, hence, from student learning). Concern has been expressed that preciseness of objectives hampers the free variation from instructor to instructor that often characterize good instruction. But being precise about terminal performance objectives places no undue restrictions on instruction, though certainly restrictions are placed on the results of instruction.

In summary, terminal student performance objectives will be useful and meaningful to the extent that they (a) have relevance to the work performance situation, (b) provide complete coverage of the overall instructional aim, (c) communicate clearly the intent of each objective, and (d) provide users of objectives with information and guidance they need and can use. If these characteristics are contained in the instructional objectives, then the likelihood of such characteristics also appearing in the instructional program to a similar degree should be increased.

Chapter 4

GUIDELINES FOR EVALUATING DERIVATION METHODS

Capabilities and Limitations of Derivation Methods

Many methods have been suggested or used for determining the terminal objectives for an instructional program. Although these methods differ in many respects, nearly all seek to resolve two basic questions:

1. What is relevant to the intended performance situation? (What are the skills and knowledges that are likely to be useful in the anticipated work performance situation?)
2. What is critical for instruction? (What are the skills and knowledges that are most likely to be needed and for which instruction in the program is most necessary?)

Any method providing valid and reliable answers to these questions is certain to be useful. Although many methods for deriving objectives exist, only a few warrant serious consideration. The value of a method depends on the validity of its products, on the procedures it employs for gathering and using information, and on the manner in which the procedures are applied. The manner in which procedures are employed is highly dependent upon the sources of information used, the types of information gathered from these sources, and the ways in which this information is used to arrive at instructional decisions.

For Army service schools, there are very many possible sources of information for instructional content. Also, there are many types of information available for possible use as criteria for selecting instructional goals. Appendix A contains two checklists, one dealing with information sources and one with types of information, that were used to explore how the Army service schools currently decide what to teach.

The premise of the present report is that "relevance" and "criticalness of instruction" are matters of greatest significance in deriving terminal student performance objectives. All other matters should be subordinate to these two. This means, for example, that the feasibility of instruction should not affect what should be the terminal objectives. In other words, a method which gives great weight to feasibility at the expense of relevance and criticalness defeats the purpose of establishing instructional goals. The determination of instructional feasibility should be made only after decisions have been made with regard to relevancy and criticalness.

Table 3 was prepared to assist the reader in evaluating various derivation methods depending upon the kinds of objectives that are desired (as discussed in Chapters 2 and 3). The purpose of this table is to indicate, in terms of levels of factors, the kind of terminal objective most likely to be produced by a given procedure.

The first column briefly names some methods or procedures that have been used to achieve relevance or criticalness or both. The numbers in parentheses immediately following each procedure refer to some specific publications

Table 3

Applicability of Derivation Procedures to Types of Terminal Objectives[a]

	Factors[b]				
	A Type	B Extent	C Relevancy	D Completeness	E Precision
Procedures for Determining What is Relevant					
1. Job description (task or skill inventory):					
a. Analyze system function requirements. (18, 19)	1, 2	3	1	2, 3	1, 2
b. Generate from matrix of equipment item vs. action types. (20)	1, 2	3	1	3	1, 2
c. Evolve from position structure outline (of duties, tasks, etc.). (21, 22, 23)	1, 2	2, 3	1	3	1, 2, 3
d. Relate to model of job behavior. (24)	1, 2	3	1	3	1
e. Listing of performance units, with or without consensus of opinion, based on intuitive judgment and/or review of publications. (25, 26)	1, 2, 3	3	1, 2	3	1, 2, 3
f. Use of existing descriptions of life action requirements. (27, 28)	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3
g. Job survey questionnaire or record (29, 30, 31, 32, 33, 26, 34)	1, 2	2, 3	1	1, 2, 3	1, 2
2. Task description (cue-response) or procedural analyses. (24, 35, 36, 23, 37, 38, 39, 19)	1, 2	1, 2	1	1, 2, 3	1
3. Outline to a functional level. (40, 41)	2, 3	2	1, 2	3	1, 2, 3
Procedures for Determining What is Critical for Instruction					
1. Task and skills analysis. (35, 42, 23, 37, 19)	1, 2	1, 2	1	1, 2	1
2. Activity questionnaire or activity ratings by job supervisors and/or job incumbents. (43, 24, 22, 33, 26, 19)	1, 2	2, 3	1	3	1, 2, 3
3. Measurement and diagnosis of performance proficiency. (44, 45, 46, 27, 28, 47)	1, 2	1, 2, 3	1, 2	1, 2, 3	1, 2
4. Hierarchical structuring of capabilities to be acquired. (48, 19)	2	1, 2	1, 2, 3	3	1, 2
Procedures for Determining Relevance and/or Criticalness					
1. Structured observation of work or life action situation. (45, 49, 50)	1, 2, 3	2, 3	1	1, 2, 3	1, 2, 3
2. Survey of incidents and/or anecdotes. (51, 52, 53, 54)	1, 2, 3	2, 3	1, 2, 3	1, 2, 3	1, 2, 3
3. Review of repair, inspection, operational, or incident reports. (32, 33)	1, 2, 3	2, 3	1	1, 2, 3	1, 2, 3
4. Survey and analysis of attitudes or behavior patterns. (55, 56)	3	2, 3	1	2, 3	1, 2
5. Studies of action relationships (correlational studies). (57, 55)	3	2, 3	1	3	1, 2
6. Instructional intent. (58, 38)	1, 2, 3	2, 3	1, 2, 3	1, 2, 3	1, 2
7. Group conferences. (59, 60)	2, 3	2, 3	1, 2, 3	1, 2, 3	1, 2, 3
8. Matrix of skill categories vs. subject-matter content. (61, 62)	2	3	1, 2, 3	3	1, 2, 3

Continued

Table 3 (*Continued*)

Applicability of Derivation Procedures to Types of Terminal Objectives[a]

	Factors[b]				
	A Type	B Extent	C Relevancy	D Completeness	E Precision
9. Survey of publications, documents, directives, etc. (34, 53)	1, 2, 3	2, 3	1, 2, 3	1, 2, 3	1, 2, 3
10. Survey of other curriculums. (63, 64)	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3
11. Conversion from existing instruction. (65)	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3
12. Judgment of individuals ("a priori" knowledge of teacher, evaluator, or official). (25)	1, 2, 3	2, 3	1, 2, 3	1, 2, 3	1, 2, 3

[a] See Section B of the Bibliography, page 43, for publications referenced after each procedure.
[b] Numerals indicate levels of factors used to compare types of objectives (see Figure 3). The levels are:
A—1, Specific Task; 2, Generalized Skill; 3, Generalized Behavior
B—1, Fully Described; 2, Partially Described; 3, Stated Only
C—1, High Relevance; 2, Moderate Relevance; 3, Low Relevance
D—1, Fully Complete; 2, Partially Complete; 3, Action Only
E—1, Fully Precise; 2, Partially Precise; 3, Vague

which describe how that procedure could be applied. These references are listed in Section B of the Bibliography.

The remaining columns of the table are devoted to the five factors (Figure 3) previously employed in classifying objectives. The numbers in each of these columns refer to levels of factors. For each procedure cited, there is at least one digit in each factor column. Where more than one digit appears, more than one level of a factor is represented. The levels listed are based on the judgment of the authors of this report and, hence, should be viewed as estimations rather than definitive listings. The judgments reflect both what a particular application of a given method actually did and what it was judged it is possible for the method to do.

The fact that more than one level of a factor often appears opposite a given procedure reflects the opinion of the authors that the procedure may yield any of the indicated levels. For example, whether a given procedure will produce level 1, 2, or 3 of a given factor depends upon how the procedure is used, or on what level the user wants. Other persons judging levels to be expected for factors attained by procedures in which they are acknowledged experts, might frequently select levels divergent from those given in Table 3.

The reader may use the table to assist him in deciding which methods might best serve his needs. For this purpose, perhaps the most fruitful approach would be to decide first which factors are of greatest concern. Then, after selecting appropriate levels of these factors, the table may be examined to determine which procedures, or special combinations of procedures, will most likely yield the desired levels and factors.

For example, suppose one has decided that Level 2 of Factor A and Level 1 of Factor B are of primary interest. A check of the table shows that seven different derivation procedures may be used to produce these levels. Selection from these procedures may be made by choosing desired levels of the remaining factors. By this successive selection process, the number of candidate methods is reduced considerably.

Often a special combination of several procedures may be desired. For instance, one may use a job description to obtain relevant units of performance (Level 3 on Factor B and Level 1 on Factor C emphasized), then a task description (to obtain Level 1 or 2 on Factor B, Level 1 on Factor D, Level 1 on Factor E), then activity ratings (to assist in establishing criticalness), and finally consider instructional intent (to fully attain Level 1 on Factor E and to assist in establishing criticalness for instruction). Many such combinations are possible as a complete approach for use in a given instructional situation, though some are more likely to be effective and efficient than others. The combination to be chosen is likely to depend on the particular resources available.

When using the table one must remain aware that where multiple levels appear, the level which is actually obtained depends on how the method is used. Thus, if one adopts a method that leans heavily upon judgments or opinions of selected individuals, the results can be adequate only to the extent that the selected individuals are knowledgeable about the work situation. It should also be noted that, particularly for some abstract skills and behaviors, suitable techniques for specifying the properties to be learned may not yet be available.

Working With the Conversion Process

Differing from the process of deriving the goals of instruction is the practice of converting existing course content and topics into the form of student performance objectives. Here, concern is with form and specificity, rather than relevance and criticalness, since the latter characteristics are not readily ascertained. Hence, the results of these conversion efforts have tended to be disappointing. That is, merely translating "knows and understands principles of vacuum tubes" into "recalls and states principles of vacuum tubes" does not accomplish a change of importance. Even attaching a list of the desired principles to the statement of the objective does not solve the problem.

Certain considerations from this report provide suggestions for a conversion procedure that would encourage the development of more meaningful and useful performance objectives, although recognizing that such a procedure would not apply all the rigor and sophistication that might be desired.

The key innovations to the conversion process are suggested as:

(1) Thorough definitions of the work performance situation, to identify the range and constraints of that situation.

(2) Comparison of each instructional topic with the situation definition, to translate topics into meaningful and relevant units of performance.

By careful application of these two features, the likelihood of stating relevant and useful performance objectives is increased. Completeness can be enhanced by probing apparent omissions in situation-topic relationships. Assessing criticalness for instruction is the principal weakness of such a process. However, criticalness is promoted by a thorough awareness of the work problem situation, if the definition of that situation contains information on the relative importance of (or the extent to which students are likely to encounter) specific performance situations.

Attention to defining the work situation as the basis for establishing performance objectives is the best available technique for introducing the concepts of relevance and meaningfulness of performance units into the derivation of objectives not only for specific job training, but also for academic and "educational" contexts.

A process similar to that described above was used and reported by Schlesinger and Beckwitt (15). They evaluated an existing school curriculum by having experienced personnel rate the importance to job performance of each curriculum topic. The nature of the topical coverage and the relative emphases were then compared with available descriptions of required job behavior. This comparison served to identify those topics providing information of background and organizational material, serving no function in job performance. The remainder of the topics had direct value in actual work performance.

Evaluating the Application of a Derivation Method

Each derivation method has certain capabilities and limitations. But, even more important, the results obtained from using a derivation method depend upon the manner in which that method was used. Rigorous procedures can become unproductive by improper application; judgmental and intuitive procedures can become valuable as a result of systematic and knowledgeable application. Thus, like any piece of machinery, the effectiveness of a method is dependent upon how it is used.

There are at least seven important factors that influence how well a derivation procedure, as the user intends to apply it, will yield relevant and critical objectives. Stated in the form of questions to be asked about the application of the procedure, these are:

(1) Is the procedure applied systematically and consistently?

(2) Does the procedure collect performance information for individual meaningful units of activity?

(3) Is performance information actively sought from sources in the work performance situation?

(4) Is performance information recorded?

(5) Is performance information used systematically and consistently to identify critical instructional needs?

(6) Does the procedure provide complete coverage of all likely aspects of occurrences of the desired work performance situation?

(7) Does the procedure foster the derivation of performance actions, conditions, and standards that are relevant to those of the work situation?

The effectiveness and efficiency of a particular application will tend to vary to the extent that affirmative answers can be made to these questions. The principal differences between many curriculum development proposals and procedures commonly used in current practice are based on the degree to which these seven factors are considered. Many of the proposals of educators and psychologists tend mainly to introduce a more active, systematic, and complete examination of what is relevant and critical. But instructional planners and classroom teachers often have felt that they had neither the time nor the manpower resources to actively seek out the performance requirements with the rigor that is desirable. Instead, they have often resorted to a process of responding to instructional demands as they are brought to their attention. Instructional feasibility and the authority status of the information source thus become the dominant considerations.

A recent brief examination of current expenditures of effort in one instructional system (Chapter 1), however, illustrated that much more effort is currently going into instructional decisions than may be realized. Table 2 cited an average of 7.7 hours of decision effort for every hour of instruction. For instruction pertaining to the more generalized performance situations, such as courses for Army officers, the ratio was much higher-over 17 hours of

decision effort for every hour of scheduled classroom time. Thus, there is here a strong implication that an economy of effort might well be achieved by more systematic application of methods for deriving instructional objectives. For an effort expenditure equivalent to that currently used, more rigorous and systematic efforts could potentially yield a considerable increase in the quality and validity of instructional decisions.

Rigorous approaches (such as many cited in the Bibliography) achieve an economy of effort expenditure by using just a few highly crucial questions, but asking them for <u>each</u> potential item of instruction, and consistently using the same basis for deciding the instructional goals. In fact, this consistent and systematic use of performance information lends itself to automatic data processing (16), decreasing even further the total effort expenditure.

Chapter 5

DISCUSSION AND CONCLUSIONS

Several common misunderstandings and misconceptions about objectives became identified through (a) discussions of the concept of performance objectives with other researchers, instructors, and training officials; (b) reading guidance documents about the preparation and use of objectives; and (c) in reviewing hundreds of objectives that were prepared by various agencies and individuals.

One misconception was that the procedures recommended by Mager (7) in preparing instructional objectives for training courses enabled one to "derive" objectives without resorting to more elaborate procedures, such as task and skill analyses, to find out what the objectives ought to be. The difference between deriving objectives and preparing (writing) objectives was not clear to everyone. For example, according to Morrill (17):

> "Our first step, then, in developing a program is to prepare objectives for that particular program. . . . And it is true that if Mager's procedures are followed, the objectives thus derived will be clear, specific and measurable."

Thus, although the consensus was that the first step in constructing a program (or any kind of instruction) centered upon the need for a set of objectives, some writers apparently believed that to "prepare" an objective was to derive it. There may be short-cut methods of derivation, but there is no short-cut to derivation.

Another misconception was that once an instructional objective was stated in performance terms, it was easy to develop the learning experiences appropriate to the objective. Terminal student performance objectives and enabling objectives certainly place limits on the instructional content, but they do not directly prescribe the selection of specific learning experiences. For example, the sequence of instruction is not inherent in a set of objectives. Student performance objectives do not tell exactly how to attain each objective, though they will often contain obvious clues for the necessary learning experiences.

Another view was that at least one performance objective was required for each unit or hour of instruction. It may be meaningful and useful to prepare a set of enabling objectives for each hour of instruction, but this is not necessarily true for terminal performance objectives. If a terminal objective covers a complex skill, for example, many hours of instruction may be required to achieve it. Of course, there may be other instances, especially when the students already possess most of the necessary knowledges and skills, in which a terminal objective can easily be attained in an hour or even less.

Many courses do not prepare a person for only one particular job; for such courses some people felt it is not possible to derive job-oriented performance objectives. Although it may not be desirable or possible to teach specific tasks in such a situation, it is possible to derive terminal objectives for a generalized work performance situation.

Further, the idea has been expressed that it is impractical to be ...ic with regard to objectives because of wide local and individual variation . Variations occur; however, the writer or originator of the objective must identify explicitly the nature of variatio... the work situation, so that the objectives will assure that the instruction will enable the student to apply his knowledges and skills more generally.

Some of the other differences in points of view, reflected in the kinds of objectives produced, are:

(1) Some objectives pertained to meaningful, ultimate goals of performance; others pertained to specific means for attaining larger goals. That is, the actions required of students, as stated in the objectives, may vary from gross duty functions to component skills and knowledges.

(2) Some objectives reflected more concern for matters of training feasibility and measurability than for job relevance and criticalness of training.

(3) Objectives varied over a wide range of factors, and these variations affected the meaningfulness and usefulness of such objectives.

(4) Many terms and differing definitions for objectives are being used, leading to the impression that similar kinds of objectives were being prepared when in fact there were great differences.

(5) Some objectives reflected an emphasis on brevity, while others sought to specify very detailed performance information

As a consequence of misconceptions about the nature, use, and worth of student performance objectives, efforts to use them have led to dissatisfaction with the concept. Since performance objectives appear to offer a potentially significant advance in instructional technology, it therefore seemed appropriate to examine the nature of such objectives a bit more closely. It was hoped that, as a result of the present examination, instructional personnel would be encouraged to entertain a more critical and constructive interest in the types of objectives being produced. Rather than condemn a worthy concept on the basis of inadequate implementation, attention should be directed at further considerations of how the concept might most appropriately be used to improve instruction.

Thus, based on the authors' examinations of curriculum decision efforts and products as they relate to this matter, a number of implications became evident. These are provided (a) to permit evaluation of present efforts to produce performance objectives, and (b) as a point of departure for further study and analysis of the nature, derivation, and use of this form of stating instructional goals.

In summary:

(1) When developing instruction through the use of performance objectives, this development proceeds sequentially through the following stages:

(a) Establishment of the instructional aim and scope.

(b) Definition of the work performance situation.

(c) Identification and selection of meaningful units of performance.

(d) Identification of immediate learning goals necessary for the attainment of each selected performance unit.

(e) Design of the appropriate learning experiences.

(2) Three general categories of student performance objectives are possible within such a sequence of instructional program development:

(a) General objectives.

(b) Terminal objectives.

(c) Enabling objectives.

(3) It is the terminal student performance objectives that denote the final criterion performance. They exist as valid representations of the instructional goals, regardless of what else is done in designing the instruction. Enabling objectives are not instructional goals in and of themselves. Rather, they represent the immediate learning demands for attaining terminal objectives.

(4) It is most important to identify meaningful units of performance as prerequisites for stating terminal student performance objectives. This identification establishes a valid foundation for the determination of the necessary enabling objectives, and for the organization and design of appropriate learning experiences.

(5) Terminal student performance objectives vary along five important factors, each influencing the utility and communicability of stated objectives:

(a) Type of performance unit.
(b) Extent of action description.
(c) Relevancy of student action.
(d) Completeness of structural components.
(e) Precision of each structural component.

(6) These five factors provide useful means by which terminal student performance objectives may be classified and compared.

(7) The prime criteria for deriving terminal student performance objectives are "relevance" and "criticalness for instruction." Feasibility considerations should not be introduced until after the terminal objectives have been identified and stated.

(8) Numerous derivation methods are available, but each has certain capabilities and limitations with regard to the five dimensions on which objectives vary.

(9) Effectiveness of derivation methods, within their range of capabilities and limitations, is influenced by the manner in which each method is applied. This effectiveness depends on the answers to the following seven questions:

(a) Is the procedure applied systematically and consistently?

(b) Does the procedure collect performance information for individual meaningful units of activity?

(c) Is performance information actively sought from sources in the work performance situation?

(d) Is performance information recorded?

(e) Is performance information used systematically and consistently to identify critical instructional needs?

(f) Does the procedure provide complete coverage of all likely aspects or occurrences of the desired work performance situation?

(g) Does the procedure foster the derivation of performance actions, conditions, and standards that are relevant to those of the work situation?

(10) Conversion to the form of performance objectives, as well as derivation of objectives for generalized performance situations, would benefit from thorough definitions of those situations.

(11) In light of the current expenditures of time in making instructional decisions, adoption of rigorous and systematic procedures might be accomplished without extensive increase in expenditure of effort.

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Appendix A

INFORMATION CHECKLISTS

CHECKLIST NUMBER 1--INFORMATION SOURCES

Field Personnel

1__ School Graduates
2__ School Graduates on Job
3__ Job Incumbents
4__ Field Commanders
5__ Job Supervisors
6__ Subordinates
7__ Staff Personnel
8__ Training Unit Personnel
9__ Overseas or ZI
10__ Unit Instructors

Field Literature

11__ Doctrine, Policies, SOP
12__ Inspection Reports
13__ Unit Logs or Records
14__ Work Orders
15__ Unsatisfactory Equipment Reports (UER)
16__ Maintenance Records
17__ Technical Publications

Other Field

18__ Hypothetical Combat Conditions
19__ ZI Unit Training Conditions
20__ Anecdotal Accounts of Events
21__ Field Usage
22__ Field Tests or Exercises
23__ Operator Units
24__ Proficiency Test
25__ Critical Incidents
26__ Unit Statistics
27__ Inspecting Agencies

School Personnel

28__ Field Experienced
29__ Instructor Qualified
30__ Instructors
31__ Students in Course
32__ Educational Advisor
33__ School Officials
34__ Newly Assigned Field Personnel
35__ Visiting Field Personnel
36__ Technicians
37__ Graduates of Manufacturer's Key Personnel Course

School Literature

38__ Existing Training Program
39__ Existing Lesson Plans
40__ Existing Training Literature
41__ Existing Course Tests
42__ Diagnostic Tests
43__ Grade Books
44__ Training Directives (CONARC, Sch)
45__ Similar Course of Other Schools
46__ Drafts of Training Manuscripts, ASubjScd, ATP, ATT
47__ Existing ATP, ATT, ASubjScd
48__ Training Topics in POI

Other School

49__ Staff Studies
50__ Army-Conducted Instructor Training (based on contractor's course)
51__ Department or Division:
52__ Previous Instruction Received by Students
53__ Previous Experience of Students
54__ Subsequent Instruction to be Received by Student
55__ Training Custom or Tradition
56__ Institution's Philosophy of Instruction

System Development

57__ Contractor-Manufacturer Personnel or Representatives
58__ Factory
59__ Design Engineers
60__ Contractor Training Course
61__ Contractor Task and Skills Analysis
62__ Contractor Reports, Models, Manuals, or Schematics
63__ Qualitative Material Requirements for Equipment
64__ Qualitative and Support Concept Documents
65__ CDC, AMC, Board
66__ User Service Test
67__ Service Test Personnel
68__ User Commands
69__ Draft FM's or TM's
70__ Theory of Operation
71__ Identical Aspects of Existing Equipment

Miscellaneous

72__ Subject Matter Experts
73__ Experienced Personnel (Not School or Field)
74__ MOS Descriptions
75__ Previous Job-Task Descriptions
76__ Equipment System (Schematics, Blueprints, etc.)
77__ Experimental Studies
78__ Previous Research Studies
79__ Operational Checkout on Equipment
80__ Anticipated Use of Special Weapons
81__ Concept of 19____ Battlefield
82__ Terrain Map Model
83__ Military Custom
84__ Publication Authors
85__ Maneuver Reports
86__ Taxonomies of Objectives

CHECKLIST NUMBER 2--TYPES OF INFORMATION

Job Occurrence

1___ Is it actually performed or used on the job?

2___ How frequently is it performed or used on the job?

3___ How soon is it performed or used on job?

4___ Is efficient performance or use required soon after job assignment?

5___ What sample of actual job incidents or behaviors represent outstanding or inadequate job performance?

6___ What degree of proficiency is required on the job?

7___ What degree of usefulness has it on the job?

8___ Is it required for operating or using equipment or materiel?

9___ Is it required for maintaining equipment or materiel?

10___ Is it required for influencing the work of others? (e.g., plan, manage, train, communicate, etc.)

11___ Is it required for accounting, storing, transporting, or requisitioning equipment or materiel?

12___ What are the actual job assignments of graduates?

13___ Is it usually performed or used independently on the job, or under supervision?

14___ What proportion of time is devoted to the activity?

15___ How many job incumbents perform or use it?

16___ Is performance dependent upon teamwork?

Indications of Compatibility and Importance

Is it relevant to: (How relevant is it to:)

17___ The unit mission?

18___ The system or equipment components?

19___ Combat missions or situations?

20___ Combat survival?

21___ More than one job or assignment?

22___ Equipment tasks or knowledges?

23___ Non-combat (day-to-day garrison) duty?

24___ The leadership functions of the job?

25___ Future job requirements? (Due to MOS changes, new equipment, etc.)

26___ The existing capability level of students?

27___ The instructional policy or philosophy of the school?

28___ The preferred instructional method: (TV, Field Exercise, Laboratory, Lecture, Etc.)

29___ What the instructors intend to teach?

30___ Anticipated or known test items?

31___ Common items in related FOI's?

32___ New or current concepts in doctrine. (tact-log-deploy-opr-etc.)

33___ The present course content?

Problem Indicators

34___ What are judged to be the specific training deficiencies?

35___ What discrepancy exists between performance needs and existing student knowledges and skills?

36___ What are the behavior or capability differences that distinguish trained personnel from untrained?

37___ What discrepancies are shown by student errors and error rates?

38___ How difficult is it to learn?

39___ How difficult is it to teach?

40___ How difficult is it to perform?

41___ How difficult is it to learn on the job?

42___ How frequently do specific maintenance problems occur?

43___ What are the special job environments? (cold, jungle, monotony, isolation, etc.)

44___ Are later learning opportunities available or adequate?

45___ How critical are factors of performance rate, timing, accuracy, or errors?

46___ How critical is it to mission success or to job effectiveness?

47___ How many job incumbents do not perform or know it satisfactorily?

48___ How satisfactory is its performance by experienced job incumbents?

Value Judgments

49___ What is the consensus of opinion on whether the item should be taught?

50___ Has it traditionally been taught?

51___ How important are the existing objectives of instruction?

52___ What is its instructional value?

53___ Is it directed or required by some authority?

54___ What priority is it judged to have for school instruction?

55___ What career value does it have (for general development of the individual)?

56___ How proficient do commanders or other users expect school graduates to be?

57___ Does it serve to prepare the students for a later learning experience?

58___ What are the interests and expectations of the students?

Training Feasibility

59___ Is it possible to train it within the time allotted?

60___ How costly is the training in terms of school personnel or facilities?

61___ Is it possible to learn it effectively within a school environment?

62___ Does it represent a measurable behavior?

Appendix B

CLASSIFICATIONS FOR A VARIETY OF STUDENT PERFORMANCE OBJECTIVES

Objective	Classification
1. The student should be able to field strip the major components of an M-14 rifle under conditions of total darkness within five minutes.	1, 3, 1, 1, 1
2. The student should be able to differentiate between linear and branching programing.	Not a terminal objective, since its action is a component part of a meaningful unit of performance.
3. Using the chemical balance, the student should be able to weigh materials accurately to the nearest milligram.	2, 3, 1, 1, 1
4. The student should be able to distinguish among warranted, unwarranted, or contradicted conclusions drawn from a statistical analysis of psychological research data.	2, 3, 1, 3, 2
5. The student should be able to maintain an awareness of safety hazards when working in a machine shop, as evidenced by such actions as: a. Shuts down machines before performing maintenance. b. Disposes of oily rags, waste, and other grease-soaked materials in metal containers. c. Wears eye protection where flying particles of metal are produced. d. Allows lathes to come to a stop of their own accord. (Etc.)	3, 2, 1, 2, 1
6. The student should be able to complete a 100-item multiple-choice examination on the subject of marine biology. The lower limit of acceptable performance will be 85 items answered correctly within an examination period of 90 minutes.	1, 3, 3, 2, 1
7. The student should be able to explain the techniques of linear frame writing.	Not a terminal objective; it is an enabling objective.

Objective	Classification
8. Using rubber and friction tape, Pliers TL-13-A, and Wire /D-1/TT, the student should be able to make a standard field wire splice, by completing each of the following steps in sequence: a. From one conductor, cut off one plier's length, about six inches. b. Mark each conductor six inches from end by inserting one conductor at a time into small hole in jaws of pliers. c. Close pliers. d. Insert long conductor in small hole about two inches from end. e. Close jaws carefully, remove insulation. f. Repeat procedures for each conductor. g. Tie long conductor of one pair to short conductor of second pair, using a square knot. (Etc.)	1, 1, 1, 1, 1
9. The student should be able to select from a list the 4 rules governing accurate map measurement, which are: a. Measure from center of mass to center of mass. b. Use correct graphic scale. c. In measuring road distance, measure on the same side of the road. d. Place the left edge of the straight edge initially at the 0 mark within the body of the scale.	Not a terminal objective; it is an enabling objective.
10. The student should be able to relate the preservation of freedom to the exercise of individual responsibilities.	Not a terminal objective; it is to vague to know what it is.
11. The student should be able to prepare a lesson plan for a particular learning experience in his field of specialization.	2, 3, 1, 2, 2

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13. ABSTRACT

An examination of the methods, terms, and criteria associated with the determination of student performance objectives was made in order to synthesize and apply the relatively new developments in Human Factors research on this subject. Educational and training research literature on the subject was examined to identify procedures currently being used or proposed. A survey of eight Army service schools was conducted to determine procedures employed by instructional personnel in determining course content. On the basis of data obtained, important problems arising in connection with the development of objectives are identified and analyzed. A system for analyzing instructional objectives by identifying factors that influence their meaningfulness and usefulness was developed. Types of student performance objectives are listed, and a classification scheme for terminal objectives is suggested. The classification is based on five factors on which a statement of an objective may vary, affecting the nature of the student action description and the communicability of the statement itself. The variety of terms associated with objectives are discussed.

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14. KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
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